Amendments to Claims

This listing of claims will replace all prior revisions and listings of claims in this application.

Listing of Claims

1. (**Currently Amended**) A method comprising:

generating a phase-shift keyed optical signal; and

propagating the phase shift keyed optical signal through a semiconductor optical amplifier in deep saturation, [[wherein -4dBm < P_{IN} < 4dBm,]] such that an optical signal exhibiting a regulated, -amplified optical power is produced;

wherein the amplified optical power is regulated to a saturation output power such that ΔP_{OUT} (dB)/ΔP_{IN}(dB) of the optical amplifier is less than about 0.25, wherein P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

1

2. (**Previously presented**) The method of claim 1, wherein the amplified optical power is regulated to about the saturation output power of the semiconductor optical amplifier.

1

3. (**Previsously Presented**) The method of claim 1, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

1

4. (**Original**) The method of claim 1, wherein the optical signal has a data-independent intensity profile.

1

5. (**Original**) The method of claim 1 wherein the optical signal is RZ-DPSK signal.

1

6. (**Original**) The method of claim 1, wherein the optical signal is an $\pi/2$-DPSK signal.

1

7. (**Original**) The method of claim 1, wherein the optical signal is a constant-intensity DPSK signal.

1

8. (**Original**) The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

1

9. (**Cancelled**)

1

10. (**Currently Amended**) A method for optical limiting amplification comprising:

inputting a phase-shift keyed optical signal having a data independent intensity profile into a semiconductor optical amplifier in a deep saturation regime [[wherein -4dBm < P_{IN} < 4dBm]] such that an optical signal exhibiting a regulated, amplified optical power is produced and output, wherein $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the power of the optical signal input into the amplifier.

1

11. (**Previously Presented**) The method of claim 10, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

1

12. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

1

13. (**Original**) The method of claim 10, wherein the optical signal is an $\pi/2$-DPSK signal.

1

14. (**Original**) The method of claim 10, wherein the optical signal is a constant-intensity DPSK signal.

1

15. (**Original**) The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

1

16.(**Cancelled**)

17. (**Currently Amended**) An optical signal processor apparatus comprising:

a semiconductor optical amplifier device adapted to operate in deep saturation [[, wherein -4dBm < P_{IN} < 4dBm,]] and to receive an RZ-DPSK optical signal having an amplitude-shift keyed optical label portion, such that the optical label portion of the signal is removed upon propagation through the semiconductor optical amplifier device;

wherein $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

18. (**Cancelled**)

19. (**Currently Amended**) An optical communication system for transmitting multi-channel phase-shift keyed optical signals comprising:

a plurality of semiconductor optical amplifiers,

wherein the system is adapted to transmit the optical signals such that the plurality of semiconductor optical amplifiers operate in a deep saturation regime [[wherein -4dBm < P_{IN} < 4dBm]] so as to provide optical power equalization of a plurality of channels of the multi-channel optical signals,

wherein $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.

20. (**Currently Amended**) An apparatus comprising:

a means for generating a phase-shift keyed optical signal; and

a means for propagating the optical signal through a semiconductor optical amplifier in deep saturation[[wherein -4dBm < P_{IN} < 4dBm]] to regulate the amplified optical power;

wherein $\Delta P_{OUT}(dB)/ \Delta P_{IN}(dB)$ is less than about 0.25, where P_{OUT} is the power of the optical signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the amplifiers.